In the Specification:

[0031] An improved ALD sequence incorporating the aforementioned invention is as follows:

1. First exposure **100, 200** : A substrate heated (or cooled) to a first temperature, T_1 **132, 232,** is exposed **102, 202** to a first gaseous reactant, allowing a monolayer of the reactant to form on the surface.
2. First evacuation: The excess reactant is removed by evacuating **124, 224** the chamber with a vacuum pump. An inert gas purge (e.g., Ar or He) can be used in conjunction to speed evacuation/removal of any excess first reactant. In some cases, the purge gas can be diatomic hydrogen (H_2) due to its low reactivity to the first reactant.
3. Second exposure **110, 210** : The substrate is then heated (or cooled) to a second temperature, T_2 **136, 236,** where T_2 **136, 236** is not equal to T_1 **132, 232**. A second gaseous reactant is introduced **112, 212** into the reactor chamber and onto the substrate. The first and second (chemi- or physi-sorbed) reactants react to produce a solid thin monolayer of the desired film. The reaction between the first and second reactants is self-limiting in that the reaction between

them terminates after the initial monolayer of the first reactant is consumed.

4. Second evacuation **126, 226**: The excess second reactant is removed by again evacuating **126, 226** the chamber with the vacuum pump. An inert gas purge (e.g., Ar or He) can be used in conjunction to speed evacuation/removal of any excess first reactant. In some cases, the purge gas can be diatomic hydrogen (H_2) due to its low reactivity to the first reactant. The substrate is then cooled (or heated) back to a first temperature, T_1 **139, 239**.
5. Repeat: The desired film thickness is built up by repeating the entire process cycle (steps 1-4) many times.